Notice of Allowability	Application No.	Applicant(s)	
	09/353,460	CHEN, JIUNN-TSAIR	
	Examiner	Art Unit	
	Thai D. Hoang	2667	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to *RCE field on 06/13/2005*.

2. ☒ The allowed claim(s) is/are *48-49 and 51-56 have been renumbered as 1-8 respectively*.

3. ☒ The drawings filed on *13 July 1999* are accepted by the Examiner.

4. ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
   a) ☐ All b) ☐ Some* c) ☐ None of the:
      1. ☐ Certified copies of the priority documents have been received.
      2. ☐ Certified copies of the priority documents have been received in Application No. _____ .
      3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

   * Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

5. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.

6. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
   (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
      1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
   (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.

   Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).

7. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☐ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____ .
7. ☒ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.

DETAILED ACTION

EXAMINER'S AMENDMENT

An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Robert R. Axenfeld on 08/10/2005.

The application has been amended as follows:

Claim 48: (Currently amended) A method for updating spreading codes assigned to wireless terminals in a CDMA wireless communication system, comprising:

(a) identifying a target wireless terminal having a signal to interference- plus-noise ratio below a predetermined threshold;

(b) assigning a new spreading code to the target wireless terminal identified in paragraph (a), by searching for an optimal signal signature corresponding to the new spreading code so as to reduce signal interference between the wireless terminals when in reverse link communication with a base station, wherein the act of searching for an optimal signal signature corresponding to the new spreading code comprises selecting a random spreading code out of a set of unused spreading codes associated with a region of signal space that is less dense when compared other regions of signal space;

(c) forwarding the new spreading code to the target wireless terminal identified in paragraph (a); and

(d) updating spreading codes assigned to wireless terminals in a CDMA wireless communication system by repeating operational acts specified in paragraphs (a), (b), and (c) on an iterative basis.

Claim 50: Cancelled.

Claim 51: (Currently amended) The method as recited in Claim 48, further comprising testing the randomly selected code to ascertain whether there is an improvement of the signal to interference-plus-noise ratio for the identified wireless terminal.

Claim 52: (Currently amended) The method as recited in Claim 48, further comprising testing the randomly selected code to ascertain whether there is an improvement of the signal to interference-plus-noise ratio for the identified wireless terminal; and selecting another spreading code in proximity to the set of unused spreading codes associated with a region of signal space that is less dense if there is no improvement in the signal to interference-plus-noise ratio for the identified wireless terminal.

Claim 53: (Currently amended) The method as recited in Claim 48, wherein the searching for an optimal signal signature corresponding to the new spreading code described in paragraph (b) further comprises performing a gradient search for the optimal signal signature.

Claim 54: (Currently amended) A method for assigning codes to wireless terminals in a CDMA wireless communication system, comprising:

estimating propagation characteristics of at least one channel used to communicate from at least one of the wireless terminals to a base station in a reverse link of the CDMA wireless communication system;

assigning spreading codes to the wireless terminals based on the estimated propagation characteristics of the at least one channel, wherein the act of assigning the spreading codes comprises:

(a) identifying a target wireless terminal having a signal to interference-plus-noise ratio below a predetermined threshold;

(b) assigning a new spreading code to the target wireless terminal identified in paragraph (a), by searching for an optimal signal signature corresponding to the new spreading code so as to reduce signal interference between the wireless terminals when in reverse link communication, wherein the act of searching for an optimal signal signature corresponding to the new spreading code comprises selecting a random spreading code out of a set of unused spreading codes associated with a region of signal space that is less dense when compared other regions of signal space;

(c) forwarding, in a forward link of the CDMA wireless communication system, the new spreading code to the target wireless terminal identified in paragraph (a); and

(d) updating spreading codes assigned to wireless terminals in a CDMA wireless communication system by repeating operational acts specified in paragraphs (a), (b), and (c) on an iterative basis.

Claim 55: (Currently amended) A system for assigning codes to wireless terminals, the system comprising:

means for estimating propagation characteristics of at least one channel used to communicate from at least one of the wireless terminals to a base station in a reverse link of the CDMA wireless communication system;

means for assigning spreading codes to the wireless terminals based on the estimated propagation characteristics of the at least one channel, wherein the act of assigning the spreading codes comprises:

(a) means for identifying a target wireless terminal having a signal to interference-plus-noise ratio below a predetermined threshold;

(b) means for assigning a new spreading code to the target wireless terminal identified in paragraph (a), by searching for an optimal signal signature corresponding to the new spreading code so as to reduce signal interference between the wireless terminals when in reverse link communication, wherein the act of searching for an optimal signal signature corresponding to the new spreading code comprises selecting a random spreading code out of a set of unused spreading codes associated with a region of signal space that is less dense when compared other regions of signal space;

c) means for forwarding, in a forward link of the CDMA wireless communication system, the new spreading code to the target wireless terminal identified in paragraph (a); and

(d) means for updating spreading codes assigned to wireless terminals in a CDMA wireless communication system by repeating operational acts specified in paragraphs (a), (b), and (c) on an iterative basis.

Claim 56: (Currently amended) Apparatus for communicating with a plurality of wireless terminals via a plurality of channels, said apparatus comprising:

a channel estimator for estimating channel propagation characteristics;

a code optimizer for assigning spreading codes to the plurality of wireless terminals based on the estimated channel propagation characteristics, wherein the codes are spreading codes; wherein the code optimizer comprises a memory storing computer program instructions; a processor for executing said stored computer program instructions; the computer program instructions defining acts of assigning spreading codes to the plurality of wireless terminals by:

(a) identifying a target wireless terminal having a signal to interference-plus-noise ratio below a predetermined threshold;

(b) assigning a new spreading code to the target wireless terminal identified in paragraph (a), by searching for an optimal signal signature corresponding to the new spreading code so as to reduce signal interference between the wireless terminals when in reverse link communication, wherein the act of searching for an optimal signal signature corresponding to the new spreading code comprises selecting a random spreading code out of a set of unused spreading codes associated with a region of signal space that is less dense when compared other regions of signal space;

(c) forwarding, in a forward link of the CDMA wireless communication system, the new spreading code to the target wireless terminal identified in paragraph (a); and

(d) updating spreading codes assigned to wireless terminals in a CDMA wireless communication system by repeating operational acts specified in paragraphs (a), (b), and (c) on an iterative basis for other wireless terminals.

Allowable Subject Matter

Claims 48-49 and 51-56, have been renumbered as 1-8 respectively.

Claims 1-8 are allowed.

The following is an examiner's statement of reasons for allowance:

Magnusson et al, US Patent No. 6,163,524, discloses code allocation in CDMA. Magnusson does not teach or fairly suggest the following features:

A method for updating spreading codes assigned to wireless terminals in a CDMA wireless communication system, comprising the steps of:

identifying a target wireless terminal; assigning a new spreading code to the target wireless terminal by searching for an optimal signal signature corresponding to the new spreading code so as to reduce signal interference between the wireless terminals when in reverse link communication with a base station, wherein the act of searching for an optimal signal signature corresponding to the new spreading code comprises selecting a random spreading code out of a set of unused spreading codes associated with a region of signal space that is less dense when compared other regions of signal space; and

updating spreading codes assigned to wireless terminals in a CDMA wireless communication system by repeating operational acts specified in paragraphs (a), (b), and (c) on an iterative basis as recited in claims 1 and 6-8.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thai D. Hoang whose telephone number is (571) 272-3184. The examiner can normally be reached on Monday-Friday 10:00am-6:30pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on (571) 272-3179. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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8/18/05